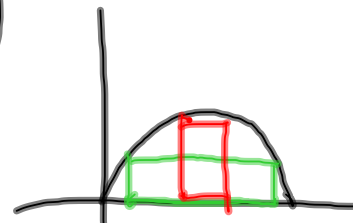
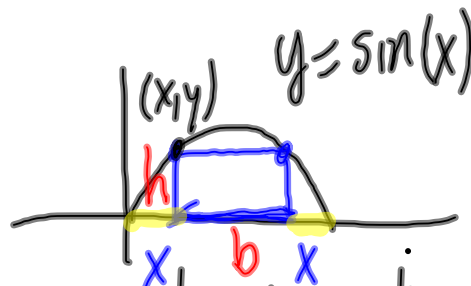


# 4.4 optimization (extrema) $\max$ $\min$ strategy p 219

1. read problem again and again
- \* 2. get equation pictures, diagrams  
label variables, constants
3. graph, restrict domain
4. critical pts, end pts  
 $1^{\text{st}}$  der test or  $2^{\text{nd}}$  der test
5. plug back in, answer the questions

Oct 22-1:21 PM

Ex 2  
p 219



find the rectangle with largest area.

max area  $A = b \cdot h$

$$A = (\pi - 2x) \sin(x)$$

$$0 \leq x \leq \frac{\pi}{2}$$

$$h = y = \sin x$$

$$h = \sin x$$

$$b = ?$$

$$x + b + x = \pi$$

$$b = \pi - 2x$$

Oct 22-1:30 PM

$$\frac{d}{dx} (\pi - 2x) \sin x = (\pi - 2x) \cos x - 2 \sin x = 0$$

$$f'(x) = 0 \text{ at } x = .7105$$

$$f''(.7105) = -4.1544$$

since  $f'' < 0$   
we have a  
max at

$$f(.7105) = 1.1222$$

$$x = .7105$$

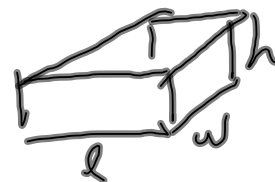
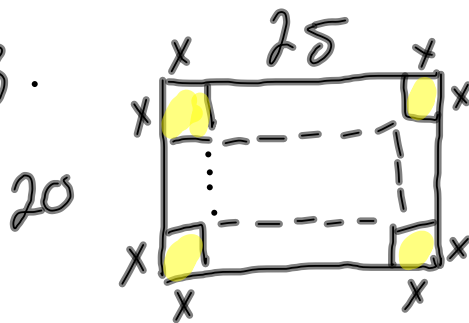
↑  
max area

$$b = \pi - 2(.7105) =$$

$$h = \sin(.7105) =$$

Oct 22-1:41 PM

Ex 3.



max volume  $v = l \cdot w \cdot h$   $h = x$

$$v = (25 - 2x)(20 - 2x)x$$

$$l = 25 - 2x$$

$$w = 20 - 2x$$

Oct 22-1:55 PM